Lecture 27 Activity: Integration by Parts

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1. Calculate the following integrals using integration by parts using the given u and v (Stewart 7.1 exercises 1-3 modified)

   1.1 $\int xe^x\,dx$, $u = x$, $dv = e^x\,dx$

   1.2 $\int \sqrt{x}\ln x\,dx$, $u = \ln x$, $dv = \sqrt{x}\,dx$

   1.3 $\int x\cos 4x\,dx$, $u = x$, $dv = \cos 4x\,dx$ (**Hint:** To find v, you'll need to use u-substitution.)

   1.4 $\int \ln x\,dx$, $u = \ln x$, $dv = dx$

2. Calculate the following integrals. (Not all of them require integration by parts.)

   2.1 $\int x\cos x\,dx$

   2.2 $\int x\cos(x^2)\,dx$

   2.3 $\int x\ln x\,dx$

   2.4 $\int x\ln(x^2)\,dx$

   2.5 $\int \arctan x\,dx$

3. **Challenge Problem:** Calculate $\int e^x \sin x$. **Hint:** Use integration by parts twice, and pick $u = e^x$ both times.